Designing monitoring and assessment strategies to include nearshore ecosystems of the Great Lakes

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Biographical Sketch of Authors

All of the authors are at the US EPA Office of Research and Development, National Health and Environmental Effects Research Laboratory, Mid-Continent Ecology Division, in Duluth MN. Dr. Kelly is Chief of the Ecosystem Assessment Research Branch (EARB), which conducts ecological research throughout the Great Lakes and Great Rivers of the Central Basin of the US. EARB efforts involve assessment design strategies, ecological indicator development, and research to define ecological responses to nutrient loading and habitat alteration in coastal systems of the Great Lakes. Dr. Morrice is a research ecologist, Dr. Yurista is a post-doctoral researcher, and Mr. Miller is an aquatic biologist, each in the EARB.

Abstract

An expectation for monitoring and assessment of very large aquatic systems is that we can develop a strategy that recognizes and reports on ecologically-important subareas using spatially-stratified, probabilistic sampling designs. Ongoing efforts monitor the main-body, offshore water quality across the Great Lakes. However, assessment of conditions in nearshore/coastal ecosystems (including harbors, embayments, tributary receiving areas) is lacking, even though nearshore systems contain critical habitats whose vulnerability to stressors inherently differs from the open water. Two issues–the diversity among, and environmental variability within, nearshore systems–present challenges. We need to define nearshore resource classes, in terms of distinct physical and ecological dimensions, that are meaningful sub-units for monitoring. Additionally, we need new monitoring measures and styles of sampling, given inherent dynamics and variability. This presentation describes recent efforts to define nearshore resource classes, including through use of new continuous, "synoptic" sampling technologies for characterizing water, sediment, and biological conditions. Results highlight an ability to discriminate shoreline zones receiving even small tributary inputs and progress in defining an embayment resource class. Efforts couple with a multi-institutional, EPA STAR cooperative agreement (U. Minnesota-Duluth and Mid-Continent Ecology Division of U.S. EPA's Office of Research and Development) to develop Great Lakes coastal indicators. The overall goal is a next-generation program of monitoring and assessment which provides a reliable information base to use in decisions affecting the quality of all the Great Lakes. *This abstract does not necessarily reflect EPA policy.*